AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method for producing a genetically modified organism of the Blakeslea genus, which method comprises the following steps

(i) transformation of at least one of the cells, and

(ii) ~~optional homokaryotic conversion of the cells obtained in step (i) to produce cells in which one or more genetic characteristics of the nuclei are all modified in an identical manner and said genetic modification manifests itself in the cells, and~~

~~(iii)~~ selection and cultivation of the genetically modified cell or cells.

2. (Original) The method according to claim 1, wherein the cells are from fungi of the *Blakeslea trispora* species.

3. (Previously presented) The method according to claim 1, wherein a vector or free nucleic acids are used in the transformation of step (i).

4. (Previously presented) The method according to claim 3, wherein the vector employed in the transformation is integrated into the genome of at least one of the cells.

5. (Previously presented) The method according to claim 4, wherein the vector employed in the transformation comprises a promoter and/or a terminator.

6. (Previously presented) The method according to claim 3, wherein a vector comprising ~~the~~ a gpd, pcarB, pcarRA and/or ptef1 promoter and/or a trpC terminator is employed in the transformation.

7. (Previously presented) The method according to claim 3, wherein a vector comprising a resistance gene is employed in the transformation.

8. (Previously presented) The method according to claim 7, wherein the vector employed in the transformation comprises a hygromycin resistance gene (hph).

9. (Previously presented) The method according to claim 6, wherein the gpd promoter comprises the sequence SEQ ID NO: 1.

10. (Previously presented) The method according to claim 6, wherein the trpC terminator comprises the sequence SEQ ID NO: 2.

11. (Previously presented) The method according to claim 6, wherein the ptef1 promoter comprises the sequence SEQ ID NO: 35.

12. (Previously presented) The method according to claim 6, wherein the gpd promoter and the trpC terminator are derived from *Aspergillus nidulans*.

13. (Previously presented) The method according to claim 3, wherein the vector comprises the sequence SEQ ID NO: 3.

14. (Previously presented) The method according to claim 1, wherein the transformation is carried out using agrobacteria, conjugation, chemicals, electroporation, bombardment with DNA-loaded particles, protoplasts or microinjection.

15. (Previously presented) The method according to claim 1, wherein a mutagenic agent is employed in the homokaryotic conversion of step (ii).

16. (Original) The method according to claim 15, wherein the mutagenic agent employed is N-methyl-N'-nitronitrosoguanidine (MNNG), UV radiation or X rays.

17. (Previously presented) The method according to claim 1, wherein the selection is carried out by labeling and/or selecting the mononuclear cells.

18. (Previously presented) The method according to claim 1, wherein 5-carbon-5-deazariboflavin (darf) and hygromycin (hyg) or 5-fluororotate (FOA) and uracil and hygromycin are employed in the selection.

19. (Previously presented) The method according to claim 3, wherein the vector employed in the transformation includes genetic information for producing carotenoids or their precursors.

20. (Previously presented) The method according to claim 3, wherein the vector employed in the transformation includes genetic information for producing carotenes or xanthophylls.

21. (Previously presented) The method according to claim 3, wherein the vector employed in the transformation includes genetic information for producing astaxanthin, zeaxanthin, echinenone, β-cryptoxanthin, andonixanthin, adonirubin, canthaxanthin, 3-hydroxyechinenone, 3'-hydroxyechinenone, lycopene, β-carotene, α-carotene, lutein, bixin, phytofluene or phytoene.

22. (Previously presented) The method according to claim 3, wherein the vector employed in the transformation is designed so as to introduce the genetic information comprised therein into the *Blakeslea trispora* genome.

23. (Previously presented) The method according to claim 3, wherein the vector employed in the transformation comprises genetic information displaying a ketolase activity and/or a hydroxylase activity after expression.

24. (Previously presented) The method according to claim 23, wherein the vector employed in the transformation comprises SEQ ID NO: 70 or SEQ ID NO: 71 or SEQ ID NO: 76 and/or SEQ ID NO: 72.

25. (Previously presented) The method according to claim 23, wherein the vector employed in the transformation has a sequence selected from the group consisting of SEQ ID NOs: 37-51.

26. (Previously presented) The method according to claim 3, wherein the vector employed in the transformation is designed so that the genetic information comprised therein is switched off in the cell.

27. (Previously presented) The method according to claim 3, wherein the transformation results in the switching off of a phytoene desaturase gene.

28. (Previously presented) The method according to claim 27, wherein the vector employed in the transformation comprises SEQ ID NO: 69.

29. (Previously presented) The method according to claim 27, wherein the vector employed in the transformation comprises the sequence SEQ ID NO: 62.

30. (Previously presented) The method according to claim 3, wherein the transformation results in the switching off of a lycopene cyclase gene.

31. (Previously presented) A genetically modified multinuclear cell of the fungi of the *Blakeslea* genus, obtained by the method of claim 1.

32. (Previously presented) A method for producing carotenoids or their precursors comprising culturing the cells of claim 31 or a mycelium formed therefrom.

33. (Previously presented) A method for producing carotenes or xanthophylls comprising culturing the cells of claim 31 or a mycelium formed therefrom.

34. (Previously presented) A method for producing astaxanthin, zeaxanthin, echinenone, β-cryptoxanthin, andonixanthin, adonirubin, canthaxanthin, 3-hydroxyechinenone, 3'-hydroxy-echinenone, lycopene, β-carotene, α-carotene, lutein, bixin, phytofluene or phytoene comprising culturing the cells of claim 31 or a mycelium formed therefrom.

35. (Previously presented) A promoter comprising SEQ ID NO: 1 or SEQ ID NO: 35 for the use in the method according to claim 1.

36. (Previously presented) A terminator comprising SEQ ID NO: 2 for the use in the method according to claim 1.

37. (Previously presented) A vector comprising SEQ ID NO: 3 for the use in the method according to claim 1.

38. (Previously presented) The vector according to claim 37, comprising SEQ ID NO: 69 and/or SEQ ID NO: 70 or SEQ ID NO: 71 and/or SEQ ID NO: 72 or SEQ ID NO: 76.

39. (Previously presented) The method according to claim 8, wherein the hygromycin resistance gene (hph) is from *E. coli*.

40. (Previously presented) A genetically modified multinuclear cell of the fungi *Blakeslea trispora* obtained by the method of claim 1.

41. (New) The method according to claim 1, wherein the method comprises the following additional step after step (i) and before step (ii):

homokaryotic conversion of the cells obtained in step (i) to produce cells in which one or more genetic characteristics of the nuclei are all modified in an identical manner and said genetic modification manifests itself in the cells.